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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Sundar Narayanan

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06/30/2006

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EXAMINER

MITCHELL, JAMES M

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 06/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/753,011	NARAYANAN, SUNDAR	
	Examiner	Art Unit	
	James M. Mitchell	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-11, 18-23 and 27-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3-11 and 18-23 is/are allowed.
- 6) ☒ Claim(s) 27, 29-31 and 33-36 is/are rejected.
- 7) ☒ Claim(s) 28 and 32 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>4/29/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to applicant's amendment filed December 2, 2005.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 27 and 29-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Cheng et al. (U.S. 6,159,821).

Cheng (Fig. 6-11) discloses:

(cl. 27) a method of forming a semiconductor structure, comprising providing a semiconductor substrate (10) wherein a first oxide (12) layer is on said substrate, a first sacrificial layer (13) is on said first oxide layer, wherein said first sacrificial layer comprises an oxide, and a first nitride layer (14) is on said first sacrificial layer followed by forming an isolation region (17; Fig. 7-11) in said substrate, wherein said forming an isolation region comprises: etching a trench (CLM 1 of Cheng; Fig. 7) into said substrate, and filling said trench with said oxide (17; Fig. 8);

(cl. 29, 30) and forming an electronic device comprising a semiconductor device from said semiconductor structure (fig. 11);

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(cl. 31) wherein said first sacrificial layer (13) is in contact with said first nitride layer (14).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 33-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hong et al. (U.S. 2002/0110994) in combination with Liang (U.S. 6,180,502).

Hong (Fig. 4-7) discloses:

a method of forming a semiconductor structure, comprising: forming an isolation region (46) in a semiconductor substrate (40), wherein a first oxide layer (42) is on said substrate, a first sacrificial layer (48) is on said first oxide layer, wherein said first sacrificial layer comprises an oxide (Par. 0051), and a first nitride layer ("SiN", not labeled; Par. 0051) is on said first sacrificial layer, wherein a second sacrificial layer (44) is between said first sacrificial layer and said first oxide layer, wherein said first sacrificial layer comprises silicon oxide (Par. 0037), said second sacrificial layer comprises silicon nitride (Par. 0018; 0037), said isolation region comprises an oxide (48; Par. 0042);

removing first nitride, first sacrificial and second sacrificial layer (Fig.7)

etching trench (Par. 0038) and filling with an oxide (Fig. 4-5);

by CVD (Par. 0014);

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forming its first sacrificial layer on said second sacrificial layer by CVD (Par. 0014) and forming silicon nitride by CVD (Par. 0051);

and forming an electronic device comprising a semiconductor device (Par. 0002) from said semiconductor structure;

forming an isolation region comprises depositing an oxide onto said first nitride layer and onto said first nitride layer and into a trench (46) adjacent first nitride, said first sacrificial and said first oxide layer (Fig. 4-5);

wherein first sacrificial layer (48) is contact with first nitride layer (Par. 0051);

and second sacrificial layer (44) is between (see Fig. 5) first sacrificial layer (48) and first oxide (42).

Hong does not appear to explicitly disclose that its semiconductor, active area, substrate is silicon, forming oxide by thermal oxidation or implanting ions in said substrate through oxide, or that the thickness for the first and second sacrificial layer is between 10 to 250 and 10 to 500 respectively.

Liang (Fig 23-27) utilizes a silicon substrate (item 200; Col. 5, Lines 53-55), forming said first oxide layer (407) on said substrate by thermal oxidation (Col. 9, Lines 30-32) and implanting ions (425) in said substrate through said first oxide layer (Fig. 24-25).

It would have been obvious to one of ordinary skill in the art to incorporate the process of forming a silicon substrate, using thermal oxidation and ion implantation in forming the trench isolation of Hong in order to provide a semiconductor substrate, oxide and active areas as required by Hong (Item 40,42 & 49; Par. 0037).

Neither Hong nor Lyon appears to disclose the claimed thickness of the layers. However, because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, the limitation would have been obvious since it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Allowable Subject Matter

Claims 3-11 and 18-23 are allowable.

Claims 28 and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art does not disclose or make obvious forming a trench and isolation region after formation of multiple layers on a substrate including second sacrificial layer between the first sacrificial and an oxide layer including all the limitations of the independent claims.

Response to Arguments

Applicant's arguments with respect to claim 3 and its dependents, filed December 2, 2005 have been fully considered and are persuasive. The previous rejection has been withdrawn. Although with respect to newly added claims the previous rejection had been restated since the claims fail to affirmatively call for the isolation regions being formed after the different sacrificial layers are formed on the substrate.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jmm
June 26, 2006




CARL WHITEHEAD, JR.
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